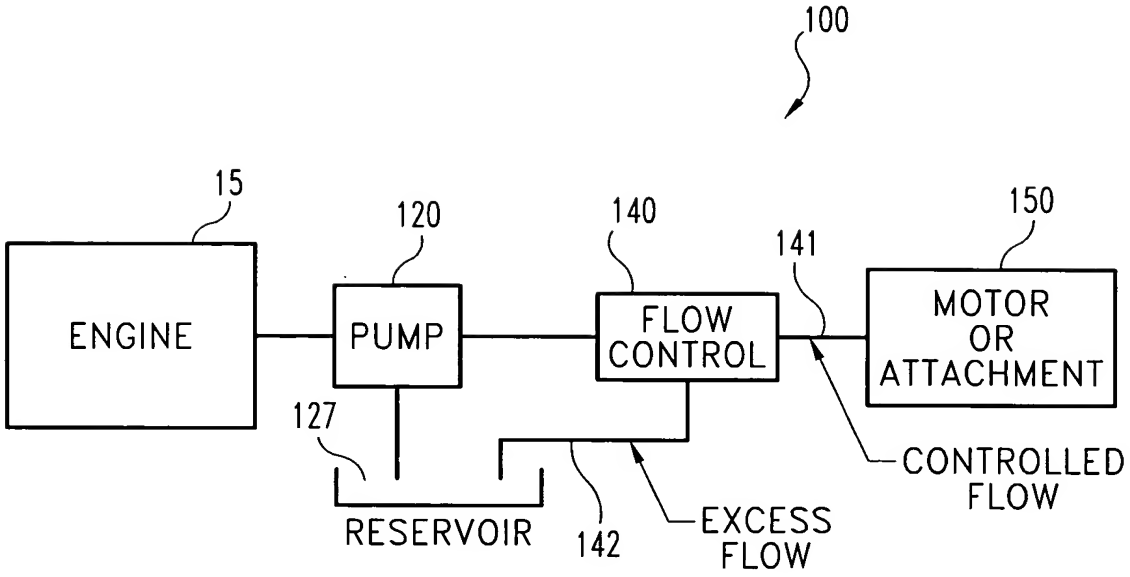
100
15
120
140
141
150
ENGINE
PUMP
FLOW CONTROL
MOTOR OR ATTACHMENT
127
RESERVOIR
142
EXCESS FLOW
CONTROLLED FLOW

Fig. 1

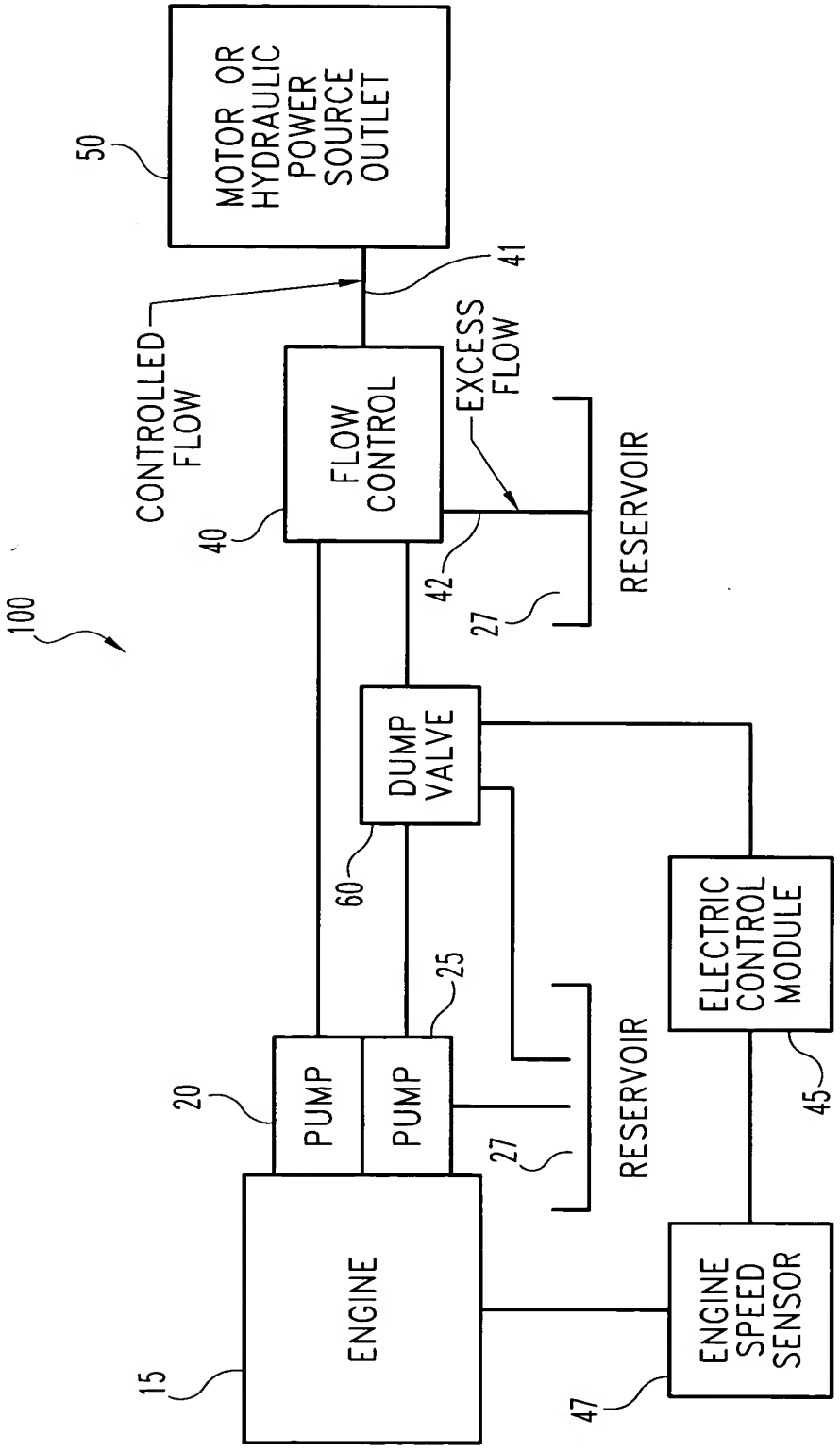
MOTOR OR HYDRAULIC POWER SOURCE OUTLET
50
41
CONTROLLED FLOW
FLOW CONTROL
EXCESS FLOW
40
42
27
RESERVOIR
100
DUMP VALVE
60
25
ELECTRIC CONTROL MODULE
45
PUMP
PUMP
20
27
RESERVOIR
ENGINE
15
ENGINE SPEED SENSOR
47

Fig. 2

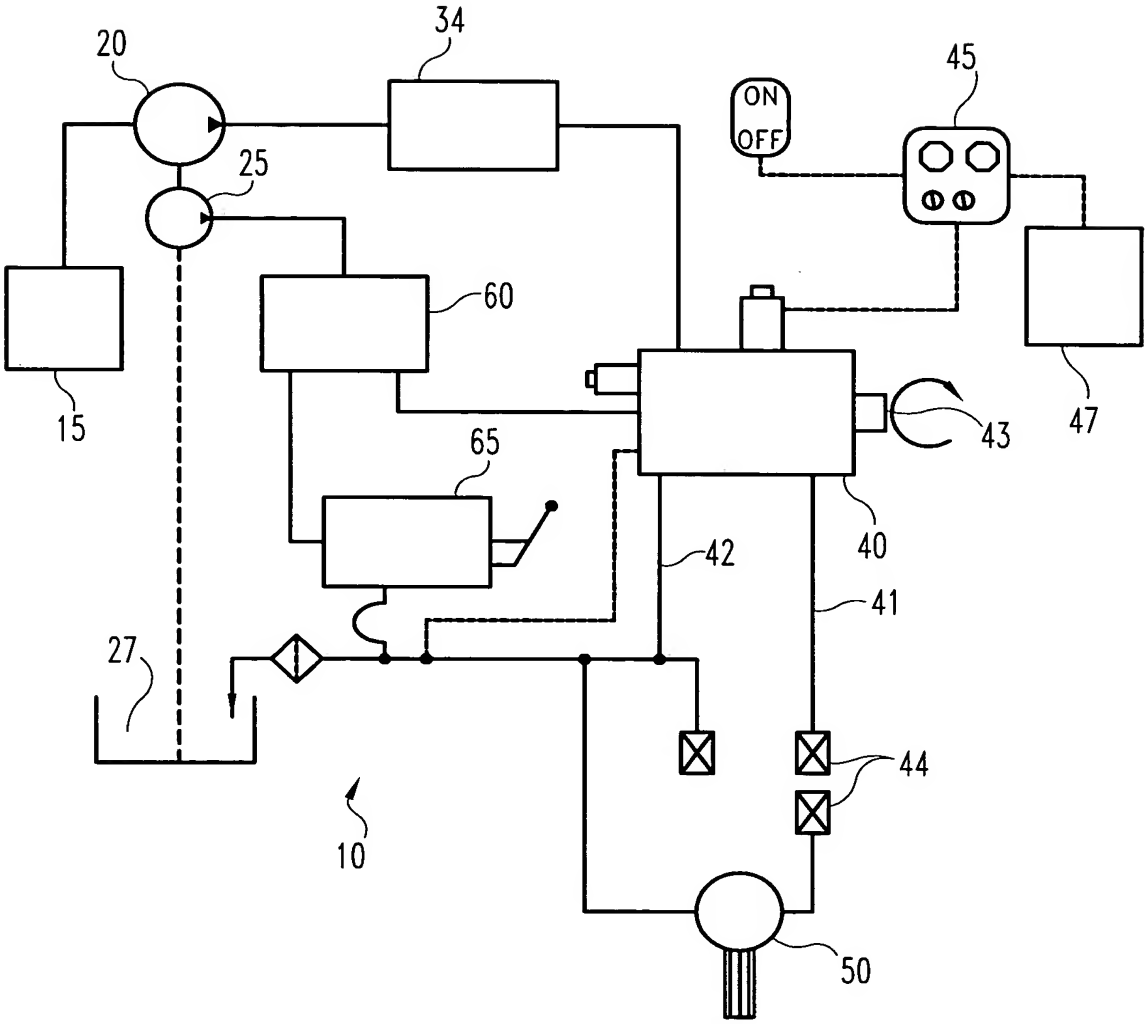

Fig. 3

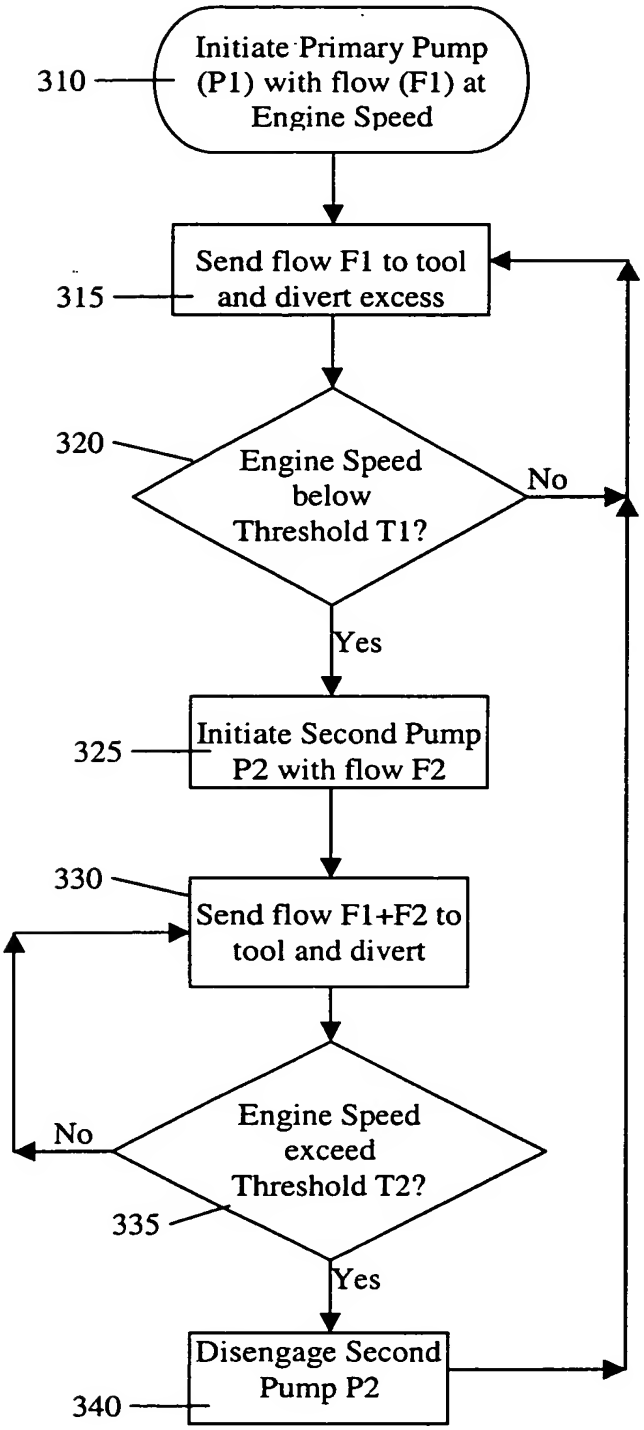
Initiate Primary Pump (P1) with flow (F1) at Engine Speed
310
Send flow F1 to tool and divert excess
315
Engine Speed below Threshold T1?
320
No
Yes
Initiate Second Pump P2 with flow F2
325
330
Send flow F1+F2 to tool and divert
Engine Speed exceed Threshold T2?
No
335
Yes
Disengage Second Pump P2
340

FIGURE 4

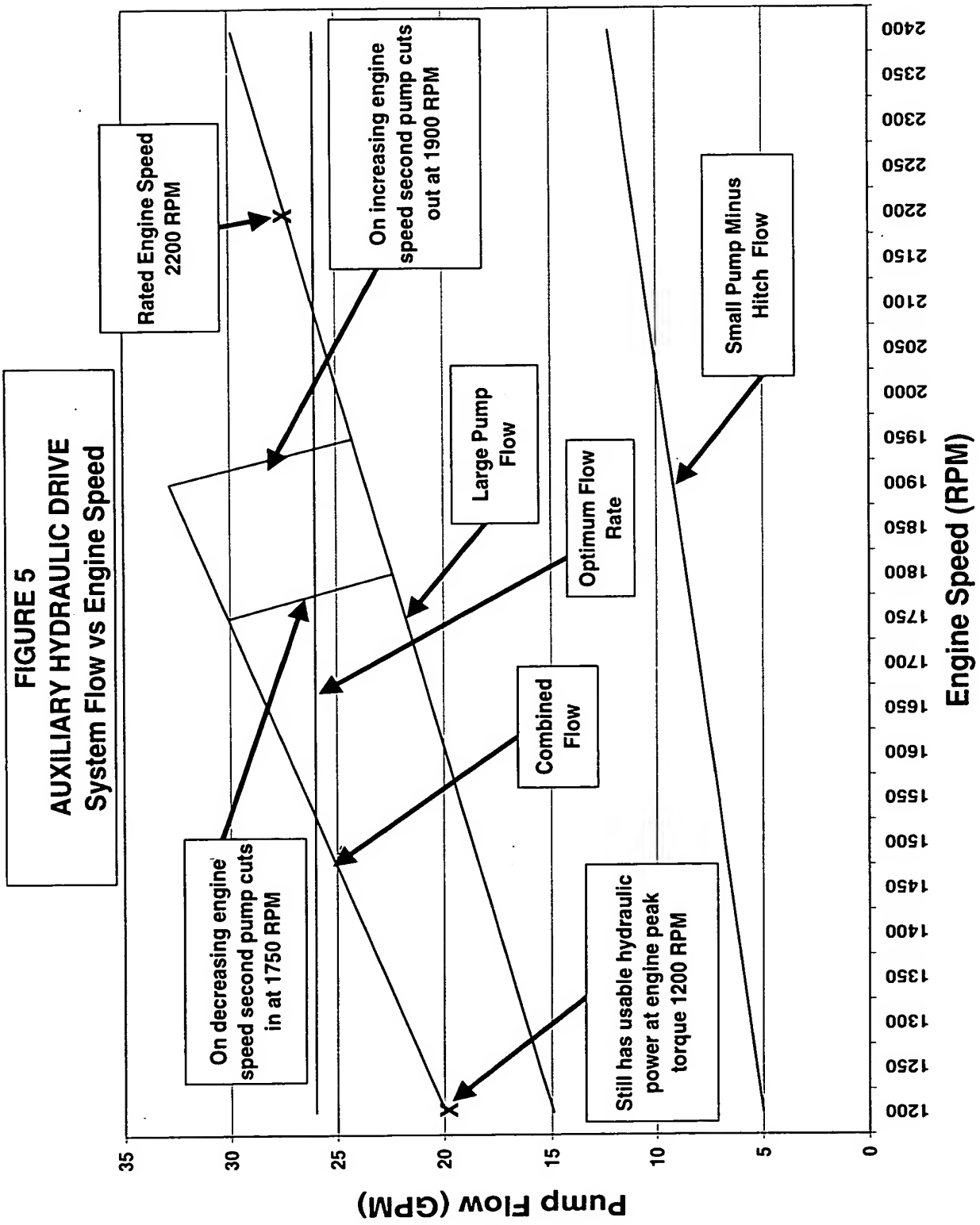
FIGURE 5
AUXILIARY HYDRAULIC DRIVE
System Flow vs Engine Speed
Rated Engine Speed
2200 RPM
On increasing engine
speed second pump cuts
out at 1900 RPM
Small Pump Minus
Hitch Flow
Large Pump
Flow
Optimum Flow
Rate
Combined
Flow
On decreasing engine
speed second pump cuts
in at 1750 RPM
Still has usable hydraulic
power at engine peak
torque 1200 RPM
Pump Flow (GPM)
35
30
25
20
15
10
5
0
Engine Speed (RPM)
1200
1250
1300
1350
1400
1450
1500
1550
1600
1650
1700
1750
1800
1850
1900
1950
2000
2050
2100
2150
2200
2250
2300
2350
2400

FIGURE 6 Engine Speed vs System Flow

Optimal Flow	Engine Speed	Large Pump only	Small Pump Minus Hitch	Small Pump Status	Combined Pumps Minus Hitch	Increasing RPM	Decreasing RPM
gal/min	RPM	Rated Flow	Rated Flow	Engine Speed rising/falling	Total Rated Flow	Actual Flow	Actual Flow
26	1200	14.9	5.0	On	19.9	19.9	19.9
26	1250	15.5	5.3	On	20.8	20.8	20.8
26	1300	16.2	5.6	On	21.8	21.8	21.8
26	1350	16.8	5.9	On	22.7	22.7	22.7
26	1400	17.4	6.2	On	23.6	23.6	23.6
26	1450	18.0	6.5	On	24.5	24.5	24.5
26	1500	18.6	6.8	On	25.5	25.5	25.5
26	1550	19.3	7.1	On	26.4	26.4	26.4
26	1600	19.9	7.4	On	27.3	27.3	27.3
26	1650	20.5	7.7	On	28.2	28.2	28.2
26	1700	21.1	8.0	On	29.1	29.1	29.1
26	1750	21.8	8.3	On	30.1	30.1	30.1
26	1800	22.4	8.6	On/Standby	31.0	31.0	22.4
26	1850	23.0	8.9	On/Standby	31.9	31.9	23.0
26	1900	23.6	9.2	Standby	32.8	32.8	23.6
26	1950	24.2	9.5	Standby	33.8	24.2	24.2
26	2000	24.9	9.8	Standby	34.7	24.9	24.9
26	2050	25.5	10.1	Standby	35.6	25.5	25.5
26	2100	26.1	10.4	Standby	36.5	26.1	26.1
26	2150	26.7	10.7	Standby	37.5	26.7	26.7
26	2200	27.3	11.0	Standby	38.4	27.3	27.3
26	2250	28.0	11.3	Standby	39.3	28.0	28.0
26	2300	28.6	11.6	Standby	40.2	28.6	28.6
26	2350	29.2	11.9	Standby	41.1	29.2	29.2
26	2400	29.8	12.2	Standby	42.1	29.8	29.8

	Displacement IN^3
570 Pump =	3.19
Second pump =	1.55
Combined =	4.74
Flow for 3 Point Hitch =	2.5
Pump Efficiency =	90%

HP Savings at 2100 RPM

36.5 Total rated flow
26 Large pump actual flow
10.5 Difference in flows
3000 Pressure
27.6 Horsepower

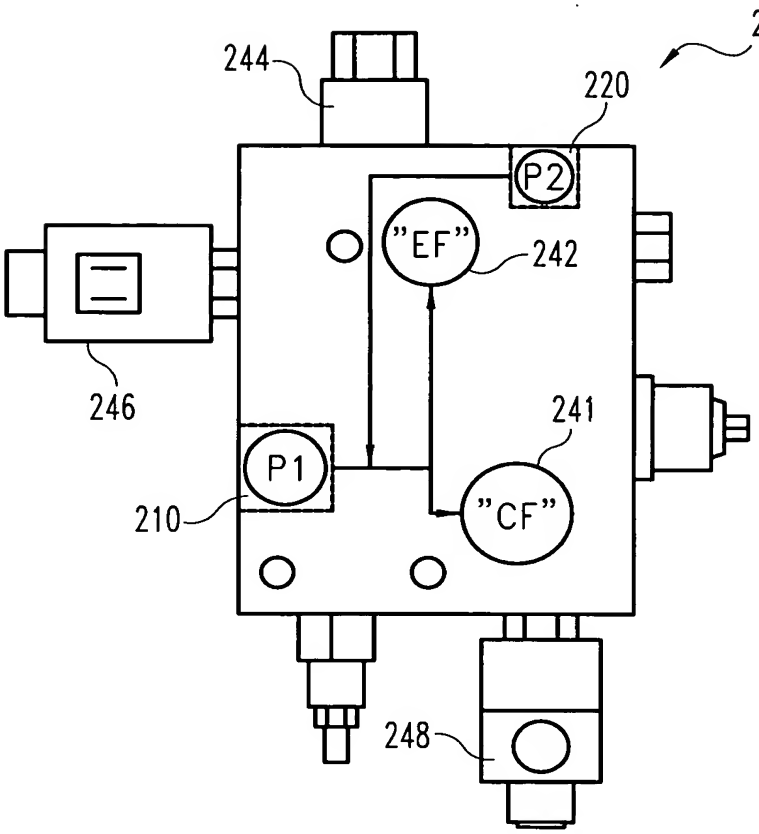

Fig. 7A

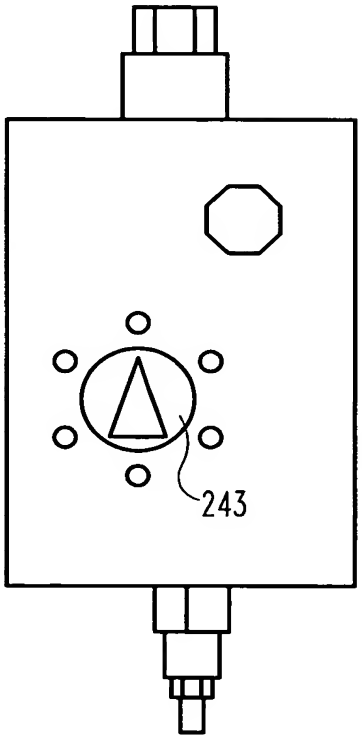

Fig. 7B